SEQUENCE LISTING

(1) GENERAL INFORMATION:

    (i) APPLICANT: IMMER, Hansueli
            FORSSMANN, Wolf-Georg
            ADERMANN, Knut
            KLESSEN, Christian

    (ii) TITLE OF INVENTION: PROCESS AND INTERMEDIATE PRODUCTS FOR PREPARING CARDIODILATIN FRAGMENTS AND HIGHLY PURIFIED CARDIODILATIN FRAGMENTS

    (iii) NUMBER OF SEQUENCES: 11

    (iv) CORRESPONDENCE ADDRESS:
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        (C) CITY: Washington
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        (E) COUNTRY: USA
        (F) ZIP: 20005-4810

    (v) COMPUTER READABLE FORM:
        (A) MEDIUM TYPE: Floppy disk
        (B) COMPUTER: IBM PC compatible
        (C) OPERATING SYSTEM: PC-DOS/MS-DOS
        (D) SOFTWARE: PatentIn Release #1.0, Version #1.30

    (vi) CURRENT APPLICATION DATA:
        (A) APPLICATION NUMBER: US 09/027,777
        (B) FILING DATE: 23-FEB-1998
        (C) CLASSIFICATION:

    (vii) PRIOR APPLICATION DATA:
        (A) APPLICATION NUMBER: DE 44 20 381.0
        (B) FILING DATE: 02-JUN-1994

    (vii) PRIOR APPLICATION DATA:
        (A) APPLICATION NUMBER: DE 195 13 784.1
        (B) FILING DATE: 10-APR-1995

    (viii) ATTORNEY/AGENT INFORMATION:
        (A) NAME: Kitts, Monica C.
        (B) REGISTRATION NUMBER: 36,105
        (C) REFERENCE/DOCKET NUMBER: P1614-8019

    (ix) TELECOMMUNICATION INFORMATION:

          (A) TELEPHONE: (202) 638-5000
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(2) INFORMATION FOR SEQ ID NO:1:

     (i) SEQUENCE CHARACTERISTICS:
          (A) LENGTH: 17 amino acids
          (B) TYPE: amino acid
          (C) STRANDEDNESS:
          (D) TOPOLOGY: linear

     (ii) MOLECULE TYPE: peptide

     (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

     Cys Phe Gly Gly Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly
     1   5   10   15

     Cys

(2) INFORMATION FOR SEQ ID NO:2:

     (i) SEQUENCE CHARACTERISTICS:
          (A) LENGTH: 15 amino acids
          (B) TYPE: amino acid
          (C) STRANDEDNESS:
          (D) TOPOLOGY: linear

     (ii) MOLECULE TYPE: peptide

     (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

     Leu Arg Ala Leu Leu Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser
     1   5   10   15

(2) INFORMATION FOR SEQ ID NO:3:

     (i) SEQUENCE CHARACTERISTICS:
          (A) LENGTH: 5 amino acids
          (B) TYPE: amino acid
          (C) STRANDEDNESS:

          (D) TOPOLOGY: linear

     (ii) MOLECULE TYPE: peptide

     (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

     Asn Ser Phe Arg Tyr
     1   5

(2) INFORMATION FOR SEQ ID NO:4:

     (i) SEQUENCE CHARACTERISTICS:
          (A) LENGTH: 19 amino acids
          (B) TYPE: amino acid
          (C) STRANDEDNESS:
          (D) TOPOLOGY: linear

     (ii) MOLECULE TYPE: peptide

     (ix) FEATURE:
          (A) NAME/KEY: Peptide
          (B) LOCATION: 1
          (D) OTHER INFORMATION: /note= "Xaa is an amino acid chain
having chain length 0 - 15 amino acids."

     (ix) FEATURE:
          (A) NAME/KEY: Peptide
          (B) LOCATION: 17
          (D) OTHER INFORMATION: /note= "Xaa is an amino acid chain
of 0 - 5 amino acids."

     (ix) FEATURE:
          (A) NAME/KEY: Cross-links
          (B) LOCATION: 2..18

     (xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

     Xaa Cys Phe Gly Gly Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu
     1   5   10   15

     Gly Cys Xaa

(2) INFORMATION FOR SEQ ID NO:5:

        (i) SEQUENCE CHARACTERISTICS:
            (A) LENGTH: 32 amino acids
            (B) TYPE: amino acid
            (C) STRANDEDNESS:
            (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: peptide

    (ix) FEATURE:
            (A) NAME/KEY: Cross-links
            (B) LOCATION: 11..27

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

    Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser Cys Phe Gly Gly Arg Met
    1   5   10   15

    Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Asn Ser Phe Arg Tyr
                20   25   30

(2) INFORMATION FOR SEQ ID NO:6:

    (i) SEQUENCE CHARACTERISTICS:
            (A) LENGTH: 14 amino acids
            (B) TYPE: amino acid
            (C) STRANDEDNESS:
            (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: peptide

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 1
            (D) OTHER INFORMATION: /product= "Modified by a Boc protecting
group and a tBu protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 4
            (D) OTHER INFORMATION: /note= "Modified by a tBu protecting group
and a Pbf protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 7

          (D) OTHER INFORMATION: /note= "Modified by a Pbf protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 8
          (D) OTHER INFORMATION: /note= "Modified by a Pbf protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 9
          (D) OTHER INFORMATION: /note= "Modified by a tBu protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 10
          (D) OTHER INFORMATION: /note= "Modified by a tBu protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 11
          (D) OTHER INFORMATION: /note= "Modified by a Acm protecting
group"

     (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

     Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser Cys Phe Gly Gly
     1   5   10

(2) INFORMATION FOR SEQ ID NO:7:

     (i) SEQUENCE CHARACTERISTICS:
          (A) LENGTH: 12 amino acids
          (B) TYPE: amino acid
          (C) STRANDEDNESS:
          (D) TOPOLOGY: linear

     (ii) MOLECULE TYPE: peptide

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 1
          (D) Note INFORMATION: /product= "Modified by a Fmoc protecting
group and a Pbf protecting group"

      (ix) FEATURE:
           (A) NAME/KEY: Modified-site
           (B) LOCATION: 3
           (D) Note INFORMATION: /product= "Modified by a OtBu protecting
group"

      (ix) FEATURE:
           (A) NAME/KEY: Modified-site
           (B) LOCATION: 4
           (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

      (ix) FEATURE:
           (A) NAME/KEY: Modified-site
           (B) LOCATION: 8
           (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"

      (ix) FEATURE:
           (A) NAME/KEY: Modified-site
           (B) LOCATION: 9
           (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

      (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

      Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly
      1   5   10

(2) INFORMATION FOR SEQ ID NO:8:

      (i) SEQUENCE CHARACTERISTICS:
          (A) LENGTH: 8 amino acids
          (B) TYPE: amino acid
          (C) STRANDEDNESS:
          (D) TOPOLOGY: linear

     (ii) MOLECULE TYPE: peptide

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 1
          (D) Note INFORMATION: /note= "Xaa is an Fmoc protecting group or
H"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site

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          (B) LOCATION: 2
          (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 3
          (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 4
          (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 6
          (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 7
          (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

     (ix) FEATURE:
          (A) NAME/KEY: Modified-site
          (B) LOCATION: 8
          (D) Note INFORMATION: /note= "Xaa is O-OH or an O-OtBu protecting
group"


     (xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

     Xaa Cys Asn Ser Phe Arg Tyr Xaa
     1                   5

(2) INFORMATION FOR SEQ ID NO:9:

     (i) SEQUENCE CHARACTERISTICS:
          (A) LENGTH: 19 amino acids
          (B) TYPE: amino acid
          (C) STRANDEDNESS:
          (D) TOPOLOGY: linear

     (ii) MOLECULE TYPE: peptide
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(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 1
     (D) Note INFORMATION: /note= "Xaa is H or an Fmoc protecting
group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 2
     (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 4
     (D) Note INFORMATION: /product= "Modified by a OtBu protecting
group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 5
     (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 9
     (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 10
     (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 14
     (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 15
     (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"
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        (ix) FEATURE:
                (A) NAME/KEY: Modified-site
                (B) LOCATION: 16
                (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

        (ix) FEATURE:
                (A) NAME/KEY: Modified-site
                (B) LOCATION: 18
                (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

        (ix) FEATURE:
                (A) NAME/KEY: Modified-site
                (B) LOCATION: 19
                (D) Note INFORMATION: /product= "Modified by a tBu protecting
group and an OtBu protecting group"

        (xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

        Xaa Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Asn Ser
        1   5   10   15

        Phe Arg Tyr

(2) INFORMATION FOR SEQ ID NO:10:

        (i) SEQUENCE CHARACTERISTICS:
                (A) LENGTH: 32 amino acids
                (B) TYPE: amino acid
                (C) STRANDEDNESS:
                (D) TOPOLOGY: linear

        (ii) MOLECULE TYPE: peptide

        (ix) FEATURE:
                (A) NAME/KEY: Modified-site
                (B) LOCATION: 1
                (D) Note INFORMATION: /product= "Modified by a Boc protecting
group and a tBu protecting group"

        (ix) FEATURE:
                (A) NAME/KEY: Modified-site
                (B) LOCATION: 4
                (D) Note INFORMATION: /product= "Modified by a Pbf protecting

group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 5
        (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 7
        (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 8
        (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 9
        (D) Note INFORMATION: /product= "Modified by a Bu protecting
group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 10
        (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 11
        (D) Note INFORMATION: /product= "Modified by a Acm protecting
group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 15
        (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 17
        (D) Note INFORMATION: /product= "Modified by a OtBu protecting
group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 18
    (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 22
    (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 23
    (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 27
    (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 28
    (D) Note INFORMATION: /product= "Modified by a Trt protecting
group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 29
    (D) Note INFORMATION: /product= "Modified by a tBu protecting
group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 31
    (D) Note INFORMATION: /product= "Modified by a Pbf protecting
group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 32
    (D) Note INFORMATION: /product= "Modified by a tBu protecting
group and an OtBu protecting group"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

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Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser Cys Phe Gly Gly Arg Met
1               5               10              15

Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Asn Ser Phe Arg Tyr
            20              25              30
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(2) INFORMATION FOR SEQ ID NO:11:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 32 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: peptide

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 11
        (D) Note INFORMATION: /product= "Modified by a Acm protecting

group"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

```
Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser Cys Phe Gly Gly Arg Met
1               5               10              15

Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Asn Ser Phe Arg Thr
            20              25              30
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